STS-75. . .

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1R (TSS-1R) and United States Microgravity Payload-3 (USMP-3) experiment equipment on board the Space Shuttle Orbiter Columbia. The STS-75 mission is scheduled to land at the KSC Shuttle Landing Facility on March 7 at 7:32 a.m.

Deployment on Day 3

On Flight Day 3, the crew will begin TSS-1R deployment by raising a 40-foot boom to elevate the satellite and its support structure. Once released, the satellite, 5 feet in diameter, will rise 12.4 miles above the orbiter while an electrically-conductive tether the diameter of a matchstick unwinds from a motorized reel. The objective for this Italian Space Agency (ASI) and NASA payload is to demonstrate the ability to deploy and control satellites on long tethers in space and to conduct space plasma experiments that include the generation of electrical power. The TSS-1 first flew on STS-46 in 1992, but a mechanical problem allowed the satellite to be deployed only to 840 feet.

As the tether passes through the electromagnetic fields of the Earth's atmosphere, an electrical charge is expected to build up between the satellite and the orbiter. Electrons from the ionosphere will be collected at the satellite and will travel down the tether to the orbiter. Approximately 27 hours after deployment, the crew will activate the 5-horsepower electric motor that will rewind the tether and draw the satellite back to the top of the support structure in the payload bay. The retrieval will be conducted in two phases over 18 hours.

The crew will also conduct research with four major USMP-3 experiment packages in Columbia's payload bay and three combustion experiments in a Glovebox facility located in the orbiter's middeck area. The payload bay experiments are designed to gather data that will continue NASA's microgravity research program. One experiment will use mercury cadmium telluride semiconductor alloy samples to study the directional solidification method of processing semiconductors. A better understanding of this process could lead to improved production methods on Earth. Another will analyze Xenon fluid at the "critical point", a phase where liquid changes to vapor. Understanding how matter behaves at this point could lead to advances in physics. Yet another experiment could lead to improvements to materials preparation and processing on Earth.

THIS AERIAL view of the Space Shuttle Columbia was shot as the Shuttle arrived at Launch Pad 39B on January 29.

Investigating fires

The three USMP-3 middeck experiments will study the characteristics of fires and how they spread in microgravity. Data will be used to help design safer spacecraft and better fire detection systems on Earth.

The STS-75 crew includes two European Space Agency (ESA) astronauts and one from the Italian Space Agency (ASI), as well as four veterans of STS-46.

Mission Commander Andrew M. Allen is on his third space flight, having served as pilot of both STS-62 and STS-46. He has more than 4,000 hours of flight time in more than 30 types of aircraft. Pilot Scott J. "Doc" Horowitz is on his first Shuttle mission. He holds a doctorate degree in aerospace engineering and was selected as one of the Outstanding Young Men in America in 1985.

Payload Commander Franklin R. Chang-Diaz has flown on STS-60, STS-46, STS-34,and STS 61-C. He holds a doctorate in applied plasma physics and is director of the Advanced Space Propulsion Laboratory at the University of Houston.

Mission Specialist Jeffrey A. Hoffman (Ph.D.) has served in this capacity on STS 61, STS-46, STS-35 and STS 51-D. He holds a doctorate degree in astrophysics and has been working on the Tethered Satellite project since 1987.

Mission Specialist Claude Nicollier (ESA) has flown on both STS-61 and STS-46. A captain in the Swiss Air Force, he holds a master's degree in astrophysics and is a Fellow of the British Interplanetary Society.

Mission Specialist Maurizio Cheli is a lieutenant colonel in the Italian Air Force. He became an ESA astronaut in 1992.

Payload Specialist Umberto Guidoni (ASI**)** is a researcher of the Space Physics Institute and is the scientist responsible for the integration of the Electrodynamic Tether Effects (RETE) experiment on the TSS-1R.

John F. Kennedy Space Center

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